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# ITCHING OF CENTRAL ORIGIN, OR BRAIN ITCH.

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Itching is so frequently observed as a complication in nervous and mental diseases that it deserves, in my opinion, a more than passing notice. Dermatologists have long since recognized the existence of what they have collectively styled neuroses of the skin, or dermatoses, but, to my knowledge, they have failed to make a clear distinction between the peripheral and the central forms of these affections.

Before approaching the subject-matter itself, a brief retrospect of the accepted neurophysiological notions regarding the various qualities of sensations I think to be in order. The brain, as is now well established, is primarily and essentially a sensitive, and secondarily, a reflex organ. The various qualities of sensation coming to this receiving and perceiving organ from the outer world are caught up by the cortical pyramidal cells, whose protoplasmic processes are comparable to tentacles, in the language of Meynert.

Within the cells are stored up the impressions thus gathered as memory images, which are of a sensorial, sensory, or (by reflex) motor character. The several qualities of such impressions are not, as is well understood, scattered promiscuously over the brain, but there are distinct and circumscribed patches of the cortical surface where memory images of the same quality are stored up. Thus there are, in addition to the well-known motor and sensorial areas of

vision and audition, others, where memory images of common sensation, especially such as originate in the skin and neighboring mucous membranes, are stored, although the exact location of these centers is still a matter of dispute.

Now, it cannot be presumed that there are special nerve fibers gathering up and conveying itching impressions from the periphery to the cortex, the fact being reasonably well established that itching is simply a perverted function of the nerves of common sensation, the same as pain, pricking, formication, etc. Unfortunately, as remarked before, the localization of common (and hence modified and perverted) sensation is still a matter of doubt. The most probable of all hypotheses at present, is that the sensory area of the several parts of the body is around or near the respective motor centers, and I claim that as there is a central or cerebral pain, a proposition which I shall discuss at length later on, so does there exist a central or cerebral pruritus.

In order, however, to gain an adequate conception of the central, it will be necessary to briefly consider the mechanism of peripheral itching, or rather those dermatoses in which a peripheral nerve irritation is the pathogenetic factor of this symptom.

The anatomical seat of peripheral pruritus has been laid by almost all writers on the subject in the touch corpuscles. That the seat of this sensation, like all the others, is somewhere in the true skin and not in any of the underlying tissues there can be no manner of doubt, because the experiments of Weber have settled this matter definitely. But, to my mind, it is highly improbable that the tactile bodies should be the organs in which and through which the sensation of itching should originate, they being in our days generally regarded as sensory terminal organs by which pressure and weight are estimated. It is much more probable that the free end-filaments in the epithelial layer of the skin should be regarded as the seat of disturbance in peripheral pruritus. That it does arise here under certain

conditions is proven by the familiar example of itching in granulating wounds. The granulations are devoid of sensation as long as they are not yet covered with epithelium, but, as soon as the regenerative process has begun and a slight film of epithelial layer (together with newly formed nerve filaments) spreads over the granulations, the process of repair is generally announced by an itching sensation, and so far as my observation goes, this itching is not only felt in the neighborhood of the defect but is also located by the patient in the newly-forming epithelial cover, which would go to show that the growth of the delicate nerve-filaments that supply the epithelial layers with sensation keeps equal pace with the growth of the latter, and that in them resides, besides the faculty of general sensation, also that of itching. Another reason why the touch-corpuscles are unlikely to be the organs through which itching is felt, is the fact that those places where these bodies are known to abound most, in the tips of the fingers, toes, and in the lips, etc., are by no means the seat of predilection for pruritus, but are, on the contrary, rather exempt from it.

Returning to the subject of peripheral dermatoses we may legitimately set down herpes zoster as a type of those neuropathic skin affections for which a well defined topographical and anatomical basis exists. The several itching skin diseases which before Hebra were comprised as prurigo may also, in a sense, be regarded as peripheral affections of the nerves of common sensations, the mechanism of their production being, according to some, the pressure on the terminal sensory filaments by an exudation (prurigo papule) or, as Anspitz assumes, a tonic spasm of the smooth muscle fibers in the skin, the *arrectores pilorum*. If the latter explanation were admissible, there would be a combined neurosis of a sensory and motor character. It is very questionable, though, whether in such cases there exists primarily such a spastic contraction entailing the hypertrophy of the *arrectores* which is observed in the latter stages of prurigo.

The same mechanism, that of compression, of the sensory nerve-endings is assumed by Unna to underlie the itching in urticaria. This observer thinks that the wheals are due to an elastic œdema caused by an obstruction of the efferent lymph channels, arising under the command of the nervous system. A congestion, thought to be due to a contraction of the veins, is, in his opinion, responsible for this obstruction.<sup>1</sup>

The theory of obstruction and compression as explaining the sensation of itching is thought to be strengthened by the experiment of an hypodermic injection of water under the skin. This in some persons causes itching, a fact, however, which admits of other interpretations than that of compression, notably that of chemical irritation. The irritating action on the tissues of water, especially distilled water, is well established. It is indeed more probable that in all, or nearly all cases of itching, there is an irritating or toxic element in the fluids surrounding the terminal nerve filaments. This is notably the case in eczematous affections.

Hebra referred all itching sensations to a slowing of the blood-current in the capillaries of the skin because the production of an hyperæmia, with an attending acceleration of circulation, but especially a local depletion produced by injuries of the vessels due to scratching, alleviates or stops itching.

Supposing that an hyperæmia and a consequent retardation of the blood's flow were the cause of itching, the congestion could be only a venous one, and in this case, too, the toxic origin would suggest itself, the waste products, or,

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1. It is very difficult and, to my thinking, physiologically impossible to conceive, that a separate or even a preponderating spastic contraction of the veins should take place under the command of the nervous system, i. e. the vaso-motor center or centers. Admitting that the veins possess a tonus similar, though, of course, much weaker than the arteries, a proposition which is denied by some physiologists, it is inconceivable how a separate contraction could arise; the stimulation of the vaso-motor centers, if it does cause a contraction at all, will do so primarily and chiefly in the arteries, the veins, owing to their feeble muscular coat and an insignificant supply of nerves, participating in the contraction in a subordinate degree. It may be remarked here, that the statement generally met with in books on general anatomy or physiology, viz: that only the larger veins are accompanied by nerves, is incorrect. All blood-vessels, even the capillaries are provided with nerves.

possibly elements of a specific irritating character, giving rise to the itching.

This toxic influence of the fluids bathing the sensory nerve terminations as an essential factor in itching seems to be beyond doubt in certain dyscrasiæ (jaundice, Bright's disease, diabetes, general carcinomatosis, etc.). But it is not in all patients affected with these diseases that we find itching as a complication; in the most intense forms of icterus, e. g. in which the skin is saturated with bile-pigment, and where we would expect the most intense itching, if it were true that this is caused by the deposition and consequent irritation of the coloring principle of the bile, pruritus is sometimes utterly absent. This would point to the necessity either of admitting that a poison is at work whose nature we ignore, or of calling to our aid in the understanding of the phenomenon once more the makeshift, "individual predisposition," however distasteful this may be to the mind of the pathologist.

The admittance of such pruritic predisposition, an essential pruritus, or itching independent of either a demonstrable or molecular skin affection, leads up to the main question, the subject matter of the present article, central or cerebral itch.

As remarked above, the question of the possibility of a central origin of pain is a very old one, and seemed up to a short time ago in dispute. The current opinion of neuropathologists on this subject seemed to be that, since lesions in the substance of the brain or spinal cord itself rarely were accompanied with painful sensations, whereas morbid conditions of the covering membranes of those organs were almost always attended by pain, the cerebro-spinal substance itself must needs be devoid of feeling.

Moreover, the unanimous verdict of the physiological experiments on the central nervous system was that the nervous substance itself lacked absolutely any trace of sensibility. Since the sort of experiment seemed in a measure to have determined and settled the question, the clinical neurologist

acquiesced in the result, though inadequate and far from decisive, of physiological investigation. But the observations made on experiments performed by nature, i. e. disease, did not tally in many instances with notions based on physiology. Edinger<sup>1</sup> was, to the writer's mind, the first to demonstrate on anatomical findings the central origin of pain in a certain class of cases. He cites a case of Greiff, in which there were, in addition to a left-sided paresis and chorea, hyperæsthesia and tearing pains in the left arm and some in the left leg. The principal post-mortem finding consisted in softened foci in the right thalamus. Edinger's own case, the only one in which an accurate study of clinical symptoms is followed by a minute and scrupulously conducted microscopical examination, showed during life, as a result of an apopleptic attack, paralysis of the right arm and leg, accompanied later on by slight athetosis, and at all times excruciating pains, in consequence of which the patient suicided. The autopsy revealed a softened focus in the external nucleus of the left thalamus opt. and in a small portion of the pulvinar. There was also descending degeneration of the lemniscus. Edinger arrives at the conclusion that hyperæsthesia and pain were produced, not by an involvement in the pathological process of the caudal portion of the internal capsule (that part of it which corresponds to about the middle third of the thalamus, and which is the universally recognized sensory tract, giving rise to peripheral pain, similarly to the production of pain by irritation of a nerve in any part of its course, the painful sensations being projected to the sensory end-organs of the periphery). Had the sensory capsular tract been pathologically changed, there would have been an anæsthesia, instead of an hyperæsthesia. There is, then, no doubt in Edinger's mind (and a careful perusal of the article has convinced the writer of the correctness of his conclusion), that there may be pain of central origin and that it is reasonable to

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1. Edinger. Gibt es central entstehende Schmerzen? Deutsche Zeitschr. f. Nervenheilk. H. 3 und 4.

infer from the anatomical findings in his case that even a cortical pain exists. From purely clinical observation it would seem that the latter proposition is very plausible and almost self-evident; for how could the pain of the hypochondriac or the hysterical, or that of hypnotic suggestion be understood or explained, unless the theory of cortical origin be invoked? The aura, too, in some cases of "cortical" epilepsy can not be explained on any other ground than that of a projection of a cortical irritation on a corresponding area of the skin.

The abnormal sensation constituting the aura may be an itching, instead of pain, burning, pricking, constriction, etc. Assuming that all epilepsies are cortical in origin, a theory which is constantly gaining ground, this local itching representing an epileptic aura would also furnish an irrefutable proof of the cerebral resp. cortical origin of itching.

I have seen more than one neurasthenic person, who, when reading, experience an intense itching in some part of the scalp, by preference on top of the head; in one case this itching was often substituted by a pricking, at others a painful feeling showing the intimate relationship, if not, at bottom, the qualitative identity of these sensations.<sup>1</sup>

Persons afflicted with this troublesome affection are always neurotic or psychopaths. Most of them can by sheer will-power produce itching in the parts usually and principally attacked by concentrating their attention on those spots, as Dr. John Hunter, a neurasthenic *par excellence*, could cause a pain in his big toe by thinking of the gout as invading that member.<sup>2</sup>

Again, it is a matter of common observation that some persons on hearing about, or seeing vermin, will begin to

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1. That itching may, and probably is, a modified, i. e. lesser pain, seems to me a justifiable conclusion, derivable from the every day observation that the induction of pain, by scratching, for example, but also by whipping or otherwise injuring the affected parts, will lessen or stop it.

2. This effect of the mind on the periphery of the body is seen in all itching affections with demonstrable changes e. g. eczema, prurigo, urticaria. There is the often emphasized vicious circle in these maladies. The peripheral sensation impresses the cortical cells in such a manner that under the influence of some exciting cause these morbidly impressed cells will cause itching even after the anatomical changes originally responsible for it, have ceased to exist.

scratch themselves to relieve itching. This is evidently brought about by an association process in the hemispheres.

The central origin of pruritus is in such cases beyond doubt. It has, furthermore, been often observed that psychical pain occasioned, for instance, by the death of friends, relatives or parents, is attended by localized or general, more or less intense itching. In fact, pruritus is a frequent complication in mental disease, that taxes the ingenuity and, unfortunately, often baffles the efforts to relieve, of the psychiatrist.

To my mind, it is quite evident that in such cases an abnormal nutritive and functional process having its seat in the cortex is projected from this organ to the skin, or such areas of it which correspond to the several cortical areas innervating them. If we look for an analogue, this most powerful lever to our understanding, the central excitations of the sensorial organs (of vision, hearing, smell and taste) readily present themselves for comparison.

Not only the subcortical centers of perception, but also the higher cortical ones of apperception<sup>1</sup> are capable to project to the respective peripheral sensorial organs (eye, ear, nose, tongue) the various sensorial qualities; the movement is in an inverse direction, i. e. from the center to the periphery.

Whilst I have often witnessed pruritus accompanying psychoses, principally melancholia, I have seen two cases in which this symptom preceded the outbreak of the mental trouble and disappeared as suddenly as it had come on with the first manifestation of the mental derangement. One of these cases was the wife of a physician. In the

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<sup>1</sup> The term "apperception" is not frequently used in the psychiatric language of the English speaking nations. A short definition is therefore, perhaps, not out of order at this place. Perception of peripheral sensorial impressions takes place in the several subcortical centers. whilst apperception, i. e. the correct interpretation, fixation and adjustment of the value and import of the impression perceived, is effected in the organ of association, the cortex. Thus, the sound of a bell is perceived as a sound pure and simple in the subcortical centers, but the apperception of this sound, its meaning, direct and implied, is realized by the higher associative process in the cortex, which consists in awaking the functional activity of a set of cortical ganglionic cells, in which certain memory images are stored up. By irritative processes these centers, the subcortical as well as the cortical, may be rendered functionally active; in the first case sounds will be heard, in the second, words or sentences. This constitutes the mechanism of hallucinations in the insane.

eighth month of pregnancy she suddenly was attacked by furious itching, involving the whole skin and all the mucous membranes accessible to the air. In this state she was delivered, when the pruritus stopped as suddenly as it had made its appearance, a stuporous melancholia setting in instead. In this state she did not recognize her children. She made a complete recovery.

The other was that of a girl 19 years of age, coming of neurotic stock. She woke up one night suddenly with the most intense itching. This lasted for several weeks, without there being the slightest trace of a skin affection, except a secondary eczema around the genitals, which formed one of the chief foci of the pruritus. Excessive onanism was the result. About two weeks after the onset she became profoundly melancholic, when suddenly the pruritus ceased. Though often in a stuporous condition, she believed herself watched and persecuted and had suicidal ideas. Repeatedly she was taken with pruritus in the course of her mental malady, when she would almost, but not quite, recover her reason. Finally she recovered her mind, after a severe attack of pruritus, which lasted for days, and in the course of several weeks subsided entirely.

In neuræsthenia and hysteria, pruritus, local and general, is not unfrequently a troublesome complication. In these maladies it is also undoubtedly a brain itch, and not a peripheral affection that we have to deal with. For the mere thought of itching, or the fixing of the attention on any particular spot of the body is capable of giving rise to intense itching. In the case of a lady who suffered from the gastro-intestinal type of neuræsthenia, an insignificant fright, a shock, but also a pleasurable emotion passing a certain limit, even a bruise or a slight blow on any part of the body, would invariably be followed, besides a copious fetid discharge from the bowels and a quivering of the abdominal walls, by an itching in various parts of the body which in proportion to the severity of the shock became more or less general and intense.

There are some unfortunate neurasthenic women in whom central pruritus, localizing in or about the vaginal orifice, constitutes the main and all-overtowering symptom: They are invariably treated by gynæcologists who almost as invariably will set down the trouble a "reflex" neurosis, having its origin in one or the other real, though paltry, more often, though, imaginary, pelvic disorder. They are treated locally for years, until they are wrecks. In the cases which I have seen, there prevailed in a striking way the rapid shifting of sensory disturbances. Either the urethra would itch to an intolerable degree, causing for weeks an incessant desire to urinate, or, when this symptom grew less, or disappeared, the ears, their meatus and surrounding parts would be attacked by the itching, or there would be an intolerable pruritus in other parts. Of course pruritus is never the exclusive symptom in such persons, neuralgias, neurotic œdema and paræsthesia of varying qualities generally co-existing.

A very serious complication in such unfortunates is onanism. For pruritus, whether it is localized in and around the orifice of the urethra, or at any other part of the pudenda, will not remain confined to its chief seat, but tend to spread. Thus the clitoridian region will be invaded with the well-nigh inevitable disastrous consequences. The pruritus in these cases leads soon to an artificial eczema by scratching, similar to the eczema of the scrotum, perineum and anus in man. These are the cases which so often terminate in utter wreckage, physical and mental; and the unwarrantable diagnosis: "neurasthenia, or insanity from onanism" is made, when, as a matter of fact, a primary central disturbance gave rise to a secondary local manifestation (itching) which in its turn led to onanism and its dire consequences. The cases of nymphomania, of which I have seen only one, are only secondarily referable to this complication; for there is a brain itch before there arise the clitoridian, or pudendal itch.

I have known neurasthenic men to become greatly reduced in strength and flesh by the loss of sleep caused by intense itching. The places of the attack would change in a most capricious manner, the favorite time was generally at night, either on going to bed or on awakening early in the morning. Most of them could produce the itching voluntarily simply by a mental effort and by fixing their thoughts on a particular spot.

The itching in hysteria is also one of the many trying and annoying symptoms of that neurosis and referable to the cortex as its starting point. I have even seen it in cases of coarse brain lesions, particularly in one instance of what I diagnosed as embolism of the right Sylvian artery. The itching was at times intensely severe and withstood all palliative treatment.

The treatment of the kind of pruritus which I have tried to elucidate in the above remarks forms a dark and discouraging chapter in therapy. Dermatologists have exhausted the resources which therapeutical ingenuity has been capable of devising. In all works on skin diseases I meet with the advice to send such persons traveling who suffer from itching combined with melancholia.

The practical results have been extremely meagre, perhaps on account of the fact that too much attention has been paid to the local manifestation of what is really a central trouble. But, this proposition being admitted, are the prospects of "cerebral" treatment any better? Does the treatment of the cerebral cortex promise more propitious results?

The only remedies which suggest themselves are the various narcotics which are known to subdue cortical irritability. Unfortunately the most reliable of all, opium and its alkaloids, is notorious for causing itching sensations in neurotic persons, not only at the tip of the nose and the adjacent mucous membrane of the nares, but also in other parts of the body. So does in my experience cannabis Indica, which in nervous individuals besides pricking, or

the "pins and needles" sensation and numbness, causes in some decided pruritus.

Many neurasthenics, however, are immediately, and sometimes permanently relieved by a combined bromide (10 to 12 grains 3 times a day) and cannabis treatment ( $\frac{1}{4}$  grain of the extract as often) provided that other remedies and procedures usually employed in the treatment of neurasthenia are not neglected.

In the toxæmic variety the rational treatment would be to modify and correct the faulty metabolism of the tissues. Here again, the perverted function of the cells could, it is reasonable to infer, be reached only through the nerves. Of such remedies we have only a slight empirical knowledge derived from the action of the alteratives so-called, but what their *modus operandi* is we do not know.

Nor are we acquainted with any drug which is capable of neutralizing supposititious poisonous substances or materials which irritate the central or peripheral sensory nerve-endings and causing pruritus.

Of all the remedies recommended for the kind of pruritus discussed in the preceding remarks, and, in fact, pruritus of any kind and origin, the warm bath with soda and starch (a handful of wash-soda and half a pound of starch to an ordinary bathtubful of warm water) seems to act better than any other remedy which I have tried. At all events, this simple measure has given better satisfaction than any other in institution treatment, where such cases are notoriously often a source of despair both to the patient and physician. Even in strictly central pruritus it generally acts well, owing, probably, to the sedative effect which the warm bath has on the cortex.



